

Atmospheric Consequences of the Hydration in Gas Phase of Aldehydes and Ketones

Veronica Vaida and Jessica L Axson

*Department of Chemistry and Biochemistry, Campus Box 215, University of Colorado,
 Boulder, CO 80309, USA*

CIRES, Campus Box 215, University of Colorado, Boulder, CO 80309, USA

Aldehydes and ketones are known oxidation products of biogenic and anthropogenic VOCs and have been observed by field studies to be present in aerosol and cloud particles. While the gas-phase chemistry of these compounds is fairly well understood, their modeled concentration and role in SOA formation remains controversial. In aqueous solution aldehydes and ketones hydrate to form alcohols. We explore the hydration of these compounds in the gas phase and examine the water and photon mediated processes of these hydrates. The formation of hydrates can contribute to aerosol growth and formation by partitioning into clouds and aerosols because of their lower vapor pressure and tendency to form intermolecular hydrogen bonds. Hydration of aldehydes and ketones has important consequences to the atmospheric photochemistry of these organic compounds. The experimental approaches employ Fourier transform spectroscopy (FTS) and cavity ringdown spectroscopy (CRDS) to observe the formation of diols and hydrates by these molecules as a function of relative humidity.

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